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Effect of Supplementation of Liquid Whey on Haematobiochemical Profile of Broiler Birds

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Abstract

A study was conduct to investigate the effect of supplementation of liquid whey on Haematobiochemical profile of broiler bird reared under deep litter system 120 day old broiler bird were randomly divided into 4 groups and were supplemented different level of liquid whey by adding in drinking water @ 0%, 5%, 10%, 15% (v/v). They were fed standard diet and reared in separate pens. The haematobiochemical profile was investigated at 42 days of age in 4 broiler chicken randomly selected from each group. Haematobiochemical profile revealed improvement in groups in which whey was supplemented @ 5% and 10% (v/v) as compared to control group. Haematobiochemical profile of broiler bird is a good indicator of health and immunity status of bird. Liquid whey contain lot of different nutrients and immunomodulatory that can improve the health and immunity status of broiler bird. Therefore, a study was conducted to investigate the effect of supplementing liquid whey on haemtobiochemical profile of broiler bird which is an indicator of health and immunity status of broiler bird.

Key words : *Broiler, haemato-biochemical profile, liquid whey, supplementation.*

Introduction

For profitable poultry production, the needs of organized and unorganized sectors are very different. From last few years, climatic change has created adverse effect on growth of poultry industry. Among impact of climatic change, high ambient temperature is the major stress factor in the poultry production system which is needed to be minimized through dietary interventions and good managemental practices. Dietary interventions are a common practice in the poultry industry to promote optimal performance and health of animals. Growth-promoting antibiotics are among feed additives used to prevent growth of intestinal pathogens and improve growth performance in broilers but it is randomly causing antibiotic resistance. To overcome these constraints, many studies have attempted to find appropriate substitutes for antibiotics and several alternatives have been suggested for the poultry industry (1). Therefore, application of feed additives, such as probiotics or probiotics and prebiotics (symbiotic), which can potentially modify intestinal microflora population, may help achieving maximum growth in poultry. The use of liquid whey in poultry supplementation has an area of great interest in broiler poultry production.

Materials and Methods

The present study was carried out on 120 commercial broiler chicks reared under deep litter system. The chicks were randomly selected and divided into 4 groups of 30 chicks each. First group was treated as T_1 (Control) and were supplemented with normal drinking water without adding liquid whey along with standard broiler feed. Second group T_2 were supplemented with 5% (v/v) liquid whey added with drinking water. Third group T_3 were supplemented with 10% (v/v) liquid whey added with drinking water and similarly fourth group T_4 were supplemented with 15% (v/v) liquid whey added with drinking water till 42 days of age. Same space/bird with similar environmental and managemental condition and same standard ration was fed to all the bird of every treatment group.

A total of 120 day-old straight run commercial broiler chicks were purchased from Hitech Nutrisol Pvt. Ltd, Hajipur. All the chicks were of the same hatch in order to keep the uniform genetic makeup. The chicks were vaccinated against Marek's disease, Gumboro and Ranikhet disease. On first day, the chicks were given only crushed maize and then given commercial starter ration for 2 days. On 3rd day chickens were wing banded, weighed individually and randomly distributed into four different dietary treatment groups of 30 chicks each. Each group were replicated 3 times with 10 chicks in each, so that the average body weight was similar in all groups. The chicks were reared under deep litter system of management with similar managemental and environmental conditions.

Dry saw dust was used to form deep litter. The litter

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was kept 3 inches during the first month and thickness was raised one inch more thereafter. The litter was racked weekly to prevent cake formation. Temperature of rearing pens was maintained using two 200 watt bulbs hanging in each pen about 2 feet above the floor. In rearing pens, chicks were served fresh and clean water adding the required amount of liquid whey as per treatment groups and broiler ration as per weekly specification. The broilers were reared under uniform condition of housing including broiler, supplementation, watering, lighting etc.

The commercial starter and finisher ration was supplemented to broiler chicken from 0- 4 weeks and 4-7 weeks, respectively. The dietary treatment consisted of a commercial broiler ration with drinking water without adding any liquid whey served as control group (T_1). The dietary treatment group (T_2) consisted of commercial broiler ration with drinking water having 5 per cent liquid whey. Commercial broiler diet with drinking water supplemented with 10 per cent liquid whey served as treatment group (T_3) and commercial broiler ration with drinking water supplemented with 15 per cent liquid whey served as treatment group (T_4).

Haemato-biochemical Parameters of broiler was estimated for Hb%, SGPT, SGOT and Differential count at the end of the experiment taking blood samples of three birds randomly from each group at the end of the trial.

(a) For Hb% : Haemoglobin (Hb) concentration was estimated by cyanmethemoglobin method by using Drabkings solution.

$$\text{Hb (g/dl)} \frac{\text{Absorbance of Test}}{\text{Absorbance of standard}} \quad 15.06$$

(b) SGPT and SGOT : Was performed IFCC method as manufactures protocol using commercial kit of coral India Pvt. Ltd.

Differential count : It was done manually by putting a drop of blood with anticoagulant from sample on a clear glass slide and smear it and then the blood smear was stained with giemsa dye, and DLC was counted under oil immersion microscopy.

The statistical data obtained were analyzed statistically as per Snedecor and Cochran (1994) as a completely randomized design by analysis of variance (ANOVA) by using General Linear Model (GLM) procedure of SPSS. Difference between treatments means were compared using Duncan's Multiple Range Test**.**

Results and Discussion

Table-1 presents the average value of blood profile of broiler chickens supplemented with liquid whey up to 42 days of experimental period.

The Hb value varied from 8.10 to 10.16 g/dl among all the treatment groups. The average value for Hb value observed were 8.10, 8.53, 10.16 and 9.33 g/dl in T_1, T_2, T_3 and T_4 groups; respectively. The average haemoglobin in all the treatment groups differed significantly ($P<0.01$) among themselves and it was found to be significantly ($P<0.01$) highest in T_3 group (with 10 percent level of whey supplementation) followed by T_4, T_2 and was lowest in T_1 group. Haemoglobin value percent increased in all treatment groups upon whey supplementation as compared to control group. It indicated that up to 10 percent level, whey supplementation had level effect on Hb percent of broiler birds.

The average value for heterophils observed were 22.50, 26.50, 17.40 and 23.30 percent in T_1, T_2, T_3 and T_4 groups; respectively. The heterophils percentage in T_2 and T_3 groups differed significantly ($P<0.01$) from each other, however heterophils percentage in T_1 and T_4 group didn't differ significantly ($P<0.01$) from each other. The lowest heterophils percentage was observed in T_3 group. This might be due to effect of whey supplementation, which decreased the level of pathogenic microbes in the broilers.

The average value for lymphocyte percentage were found to be 71.20, 66.36, 76.26 and 68.26 percent in T_1, T_2, T_3 and T_4 groups; respectively. All the values of lymphocyte differed significantly ($P<0.01$) among themselves. The highest values were observed for T_3 followed by T_1, T_4 and was lowest in T_2 group.

The average value for monocyte percentage were observed to be 4, 5, 5 and 6 percent in T_1, T_2, T_3 and T_4 groups; respectively. Highest monocyte percentage was observed in T_4 followed by T_2, T_3 and lowest in T_1 (Control) but the difference was non-significant ($P<0.01$) among the different treatment groups. Here T_2, and T_3 showed equal average value for monocyte percent.

The average eosinophil percentage observed were 2, 3, 2 and 2 percent in T_1, T_2, T_3 and T_4 groups; respectively. Although higher value was observed in T_2 group but T_3 and T_4 groups showed same value as control. The differences among all the groups were non-significant.

Average value of basophils were 1, 1, 0 and 1 percent in T_1, T_2, T_3 and T_4 groups; respectively. T_1, T_2 and T_4 group had equal average value for basophil percent and there was no significant difference.

The average value for SGPT varied from 19.27 to 34.39 ì/l. The values observed were 23.40, 19.27, 26.71 and 34.39 ì/l and in T_1, T_2, T_3 and T_4 groups; respectively. The highest value was observed in T4 group

Table-1 : Effect of different levels of whey supplementation on blood profile of broiler chickens on 42^{n}d day of experimental period (Mean + S.E.).

Treatment /Parameter	T_1	T_2	T_3	T_4
Hb (g/dl)	8.10^{a} + 0.057	8.53^{b} + 0.08	10.16^{d} + 0.08	9.33^{c} + 0.08
Heterophils %	22.50^{b} + 0.28	26.50^{c} + 0.28	17.40^{a} + 0.23	23.30^{b} + 0.17
Lymphocyte %	71.20^{c} + 0.11	66.36^{a} + 0.20	76.26^{d} + 0.14	68.26^{b} + 0.14
Monocyte %	4.00 + 0.00	5.00 + 0.00	5.00 + 0.00	6.00 + 0.00
Eosinophil %	2.00 + 0.00	3.00 + 0.00	2.00 + 0.00	2.00 + 0.00
Basophil %	1.00 + 0.00	1.00 + 0.00	0.00 + 0.00	1.00 + 0.00
SGPT (ì/l)	23.40^{b} + 0.058	19.27^{a} + 0.037	26.71^{c} + 0.003	34.39^{d} + 0.141
SGOT(ì/l)	153.76^{b} + 0.088	150.40^{a} +0.134	185.64^{c} + 0.030	242.75^{d} + 0.128

Means with different superscripts in a row differ significantly (P<0.01).

followed by T3, T1 and lowest in T2 group. SGPT values differed significantly (P<0.01) among all the groups.

The average value for SGOT observed were 153.76, 150.40, 185.64, and 242.75 /l in T1, T2, T3 and T4 groups; respectively. Highest value was observed in T4 followed by T3, T1 and was lowest in T2 group. All the observations for SGOT differed significantly (P<0.01) among themselves.

From the result, it was found that whey supplementation at the rate of 5 to 10 percent level has positive effect on blood profile of broilers, but when supplemented at 15 percent level, it has adverse effect on liver function.

The average value of blood profile of broiler chickens supplemented with liquid whey up to 42 days of experimental period for Hb were found to be were 8.10, 8.53,10.16 and 9.33 g/dl, for heterophils were found to be 22.50, 26.50, 17.40 and 23.30 percent, for lymphocyte were found to be 71.20, 66.36,76.26 and 68.26 percent , for Monocyte were found to be 4, 5, 5 and 6 percent, for Eosinophil were found to be 2,3,2 and 2 percent, for Basophil were found to be 1, 1, 0 and 1 percent in T1, T2, T3 and T4 groups ; respectively.

It was found that Hb percent increased in all treatment groups upon whey supplementation as compared to control group and up to 10 percent level, whey supplementation had positive effect on Hb percent of broiler birds but after that decreases. The lowest heterophil percentage was observed in T3 group might be due to effect of whey supplementation, which decreased the level of pathogenic microbes in the broilers. However, lymphocyte, eosinophil and monocyte showed irregular trend but it can be concluded that treatment groups showed better blood profile than control group.

The average value for SGPT observed were 23.40 ,19.27, 26.71 and 34.39ì/l and for SGOT observed were 153.76, 150.40, 185.64, and 242.75 (ì/l), in T1, T2, T3 and T4 groups; respectively. From the result, it was found that whey supplementation up to 5 percent level has positive effect on liver of broilers, but when supplemented at 15percent level it has detrimental effect on liver. This result was in accordance with (2) who reported that long-term (up to 42 days) supplementation with higher level of whey protein concentrate to broiler chicken significantly decreased the heterophil/lymphocyte ratio (P<0.05). (3) reported and recommended to use whey protein for improving the liver antioxidant enzymes in broiler chickens. However, this result is not in agreement with the findings of (4), who found that whey protein supplementation to chickens exhibit no significant influence on packed cell volume, haemoglobin, lymphocytes and polymorph nuclear leukocyte while exhibit significant impact on leukocytes and platelets count of blood. (5) found that supplementation of ACIDAL ML and liquid whey to broiler birds, increased red blood cells, haemoglobin but decreased WBC and lymphocyte. This result is not in accordance with (6), who reported that haematological parameters remained unchanged during whey protein treatment to broiler birds.

Conclusions

From the above finding it may be concluded that supplementation of liquid whey upto 10% (v/v) level along with drinking water to commercial broiler birds improved the haematobiochemical profile and hence the health and immunity status of the broiler birds, so it may be recommended to broiler farmers to supplement fresh liquid whey upto the level of 10% (v/v) along with drinking water to commercial broiler for better performance of the boiler birds.

References

1. Abd El-Hack, Mahgoub M.E., Alagawany S.A. and Dhama K. (2015). Influences of dietary supplementation of antimicrobial cold pressed oils mixture on growth performance and intestinal microflora of growing Japanese quails. *Intl. J. Pharmacol.*, 11: 689-696.
2. Szczurek W., Szymczyk B., Arczewska-W³osek A., Józefiak D. and Alloui M.N. (2013). The effects of dietary whey protein concentrate level on performance, selected

intestinal tract and blood parameters, and thiobarbituric acid reactive substances in the liver and breast meat of broiler chickens. *J. Anim. Feed Sci.,* 22: 342–353.

3. Afkhami M., Kermanshahi H. and Heravi R.M. (2020). Evaluation of whey protein sources on performance, liver antioxidants and immune responses of broiler chickens challenged with ethanol. *J. Anim. Physiol. Anim. Nutr (Berl),* 104(3): 898-908.
4. Kanza M.M., Sameen A., Khan M.U., Shariati M.A. and Hristova V.K. (2017). Impact of cheese whey protein on growth performance of broiler: An approach of cheese whey utilization in poultry feed. *J. Microbiol. Biotech. Food Sci.*, 6(4): 1117-20.
5. Bouassi T., Libanio D., Mesa M.D., Gil A., Tona K. and Ameyapoh Y. (2021). Effect of whey and ACIDAL®ML mixed in drinking water on hen's growth performance, haemato-chemical and serum immunological parameters. *British. Poult. Sci.,* 62(1): 138-146.
6. Odunsi A.A., Onifade A.A. and Babatunde G.M. (1999). Response of broiler chicks to virginimycin and dietary protein concentrations in the humid tropics. *Archivosdezootunia***.** 48: 317-325.